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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* HONG GUI, AMBUJ SHATDAL, and CURT J. ELLMANN

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Appeal 2009-001472  
Application 10/706,656<sup>1</sup>  
Technology Center 2100

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Decided: May 24, 2010

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Before JAMES D. THOMAS, JEAN R. HOMERE, and THU A. DANG,  
*Administrative Patent Judges.*

HOMERE, *Administrative Patent Judge.*

DECISION ON APPEAL

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<sup>1</sup> Filed on November 12, 2003. The real party in interest is NCR Corp.  
(App. Br. 1.)

# I. STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) (2002) from the Examiner's final rejection of claims 1 through 28. (App. Br. 1.) We have jurisdiction under 35 U.S.C. § 6(b) (2008).

We affirm.

## *Appellants' Invention*

Appellants invented a method, system, and storage medium for storing, utilizing, and maintaining materialized views that contain results of cube-based operations. (Spec. 3, para. [09]; spec. 4, para. [026].)

## *Illustrative Claim*

Independent claim 1 further illustrates the invention as follows:

1. A database system comprising:
  - a storage to store a view containing results of a cube-based operation on at least one base table, the view containing a first result set for a group-by on a first grouping set, and a second result set for a group-by on a second grouping set; and
  - a controller, in response to a change to the at least one base table, to:
    - update the first result set by computing a change to the first result set based on a change in the at least one base table; and
    - update the second result set by computing a change to the second result set based on the change to the first result set.

## *Prior Art Relied Upon*

The Examiner relies on the following prior art as evidence of unpatentability:

Cochrane	2003/0093407 A1	May 15, 2003
Bellamkonda	7,035,843 B1	Apr. 25, 2006

*Rejections on Appeal*

The Examiner rejects the claims on appeal as follows:

Claims 1 through 5, 13 through 16, and 22 through 24 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Cochrane.

Claims 6 through 12, 17 through 21, and 25 through 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Cochrane and Bellamkonda.

*Appellants' Contentions*

Appellants contend that Cochrane's disclosure of updating the entries in a view based on changes to the base table, whereby aggregate changes to the base table produce a delta cube in accordance with specified group sets, does not teach updating one result set based on a change to another result set where both result sets correspond to respective group sets. (App. Br. 4-6.) Further, Appellants argue that Cochrane's disclosure of how underlying base tables impact a materialized view is irrelevant to "updat[ing] the second result set by computing a change to the second result set based on the change to the first result set," as recited in independent claim 1. (App. Br. 7; Reply Br. 1-2.) In particular, Appellants allege that Cochrane's disclosure of computing a change to a materialized view based on an underlying table corresponds only to the first update task, as claimed. (App. Br. 8.)

*Examiner's Findings and Conclusions*

The Examiner finds that Cochrane's disclosure of changing one dimension of a hierarchical data cube will directly affect another dimension of the same data cube teaches that changes in one result set of a data cube will reflect changes onto a second result set of the same data cube. (Ans. 25-27.) Additionally, the Examiner finds that Cochrane's disclosure of

cascading changes refers to modifying child records based on changes to related parent records within a hierarchy. (*Id.* at 27.) Therefore, the Examiner finds that cascading changes on Cochrane's base tables amounts to changing the summary tables as well. (*Id.*)

## II. ISSUE

Have Appellants shown that the Examiner erred in finding that Cochrane anticipates independent claim 1? In particular, the issue turns on whether Cochrane teaches "updat[ing] the second result set by computing a change to the second result set based on the change to the first result set," as recited in independent claim 1.

## III. FINDINGS OF FACT

The following Findings of Fact ("FF") are shown by a preponderance of the evidence.

### *Cochrane*

1. Cochrane generally relates to database management systems and, in particular, to "incrementally maintaining a materialized view with complex grouping expressions derived from at least one table in a database stored on a computer." (1: para. [0003], [0009].)

2. Cochrane's Figure 1 depicts a database service module (114) that supports the functions of Structured Query Language ("SQL"), including definitions, access control, retrieval, and update of user and system data. (2: para. [0024].)

3. Cochrane discloses hierarchical data cubes as a set of ROLLUP()'s, one for each dimension. (4: para. [0064].) In particular,

Cochrane discloses an SQL statement that reflects a hierarchical data cube according to the hierarchies of three dimensions: product, location and time. (*Id.*) Further, Cochrane discloses that the result of an example query consists of different grouping combinations. (*Id.*)

4. Cochrane discloses that inserting, deleting, and updating a single row of base data can affect multiple rows in a summary table. (6: para. [0090].)

5. Cochrane discloses complex grouping expressions, including CUBE( )-expressions that produce all possible grouping combinations for a given set of grouping attributes. (4: para. [0059], [0060].) Further, Cochrane discloses an example of incrementing summary tables with complex grouping expressions, whereby  $A_1$ ,  $A_2$ , and  $A_3$  are grouping attributes in the complex grouping expression ( $A_1$ ,  $A_2$ , and  $A_3$ ) in summary table t. (6: para. [0104]; 7: para. [0107].)

*Bellamkonda*

6. Bellamkonda generally relates to database management systems and, in particular, to techniques for efficiently evaluating database queries, including hierarchical cubes. (Col. 1, ll. 21-24.)

7. Bellamkonda discloses that a grouping distinguisher or grouping identifier is a single number that distinguishes groupings at each stage of computation and propagation. (Col. 11, ll. 52-56.) Further, Bellamkonda discloses both hash partitioning and partitioning rows on the grouping identifier. (Col. 17, ll. 20, 2125-26.)

#### IV. PRINCIPLES OF LAW

##### *Anticipation*

In rejecting claims under 35 U.S.C. § 102, “[a] single prior art reference that discloses, either expressly or inherently, each limitation of a claim invalidates that claim by anticipation.” *Perricone v. Medicis Pharm. Corp.*, 432 F.3d 1368, 1375 (Fed. Cir. 2005) (citing *Minn. Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1565 (Fed. Cir. 1992)).

Anticipation of a patent claim requires a finding that the claim at issue “reads on” a prior art reference. In other words, if granting patent protection on the disputed claim would allow the patentee to exclude the public from practicing the prior art, then that claim is anticipated, regardless of whether it also covers subject matter not in the prior art.

*Atlas Powder Co. v. IRECO, Inc.*, 190 F.3d 1342, 1346 (Fed Cir. 1999)  
(internal citations omitted).

##### *Obviousness*

“On appeal to the Board, an applicant can overcome a rejection [under § 103] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.” *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)  
(citation omitted).

#### V. ANALYSIS

##### *35 U.S.C. § 102(a) Rejection*

*Claim 1*

Independent claim 1 recites, in relevant part, “updat[ing] the second result set by computing a change to the second result set based on the change to the first result set.”

As detailed in the Findings of Fact section above, Cochrane discloses maintaining a materialized view with groups derived from at least one table stored in a database. (FF 1.) Cochrane discloses a database service module that accesses, controls, retrieves, and updates data. (FF 2.) In particular, Cochrane discloses a hierarchical data cube that consists of multiple dimensions. (FF 3.) Further, Cochrane discloses that updating a single row of base data can affect multiple rows of data. (FF 4.)

We find that Cochrane’s disclosure teaches a database service module that is capable of updating a multidimensional hierarchical data cube, whereby different groupings contain similar data. We also find that Cochrane’s disclosure teaches that upon updating a particular row of data, all data groupings utilizing such row are subsequently affected. Consequently, we find that Cochrane’s disclosure of updating a multidimensional data cube containing different groupings teaches utilizing the changes to a first group in order to update a second group in the hierarchy. Thus, we find that Cochrane teaches “updat[ing] the second result set by computing a change to the second result set based on the change to the first result set,” as recited in independent claim 1. It follows that Appellants have not shown that the Examiner erred in finding that Cochrane anticipates independent claim 1.



*Claims 2, 4, 5, 13, 14, 22, and 23*

Appellants do not provide separate arguments for patentability with respect to independent claims 13 and 22, and dependent claims 2, 4, 5, 14, and 23. Therefore, we select independent claim 1 as representative of the cited claims. Consequently, Appellants have not shown error in the Examiner's rejection of independent claims 13 and 22, and dependent claims 2, 4, 5, 14, and 23, for the reasons set forth in our discussion of independent claim 1. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2009).

*Claims 3, 15, 16, and 24*

Appellants contend that Cochrane's disclosure of incrementally updating a materialized view does not teach multiple levels of updates. (App. Br. 9-10.) In particular, Appellants argue that Cochrane does not teach "updat[ing] the third result set by computing a change to the third result set based on the change to the second result set," as recited in dependent claim 3. (*Id.*) We do not agree.

As detailed in the Findings of Fact section above, Cochrane discloses different groupings combinations (e.g., A<sub>1</sub>, A<sub>2</sub>, and A<sub>3</sub>). (FF 3, 5.) We find that Cochrane's disclosure teaches at least three groupings. Consequently, we find that Cochrane's disclosure of three groupings, in conjunction with utilizing the changes to a first group in order to update a second group in the hierarchy, teaches utilizing the changes to a second group in order to update a third group in the hierarchy. Thus, we find that Cochrane teaches the disputed limitation. It follows that Appellants have not shown that the Examiner erred in finding that Cochrane anticipates dependent claim 3.

Appellants do not provide separate arguments for patentability with respect to dependent claims 15, 16, and 24. Therefore, we select dependent

claim 3 as representative of the cited claims. Consequently, Appellants have not shown error in the Examiner's rejection dependent claims 15, 16, and 24 for the reasons set forth in our discussion of dependent claim 3. *See* 37 C.F.R. § 41.37(c)(1)(vii).

*35 U.S.C. § 103(a) Rejection*

*Claims 6, 10 through 12, 17, 18, 25, and 26*

Appellants offer the same argument set forth in response to the anticipation rejection of independent claim 1 to rebut the obviousness rejection of dependent claims 6, 10 through 12, 17, 18, 25, and 26. (App. Br. 10.) We have already addressed this argument in our discussion of independent claim 1, and we found it unpersuasive. Consequently, Appellants have not shown that the Examiner erred in concluding that dependent claims 6, 10 through 12, 17, 18, 25, and 26 are unpatentable over the combination of Cochrane and Bellamkonda.

*Claims 7 through 9*

Appellants contend that Bellamkonda's disclosure of a group distinguisher is not used for the purpose of performing hashing distribution because none of the keys used for partitioning are assigned a predefined value. (App. Br. 10-11.) Therefore, Appellants argue that Bellamkonda does not teach "the controller is adapted to distribute rows in the first result set across the access modules based on a hash of columns of the second group set and at least another column that is assigned a predefined value," as recited in dependent claim 7. (*Id.*) We do not agree.

As detailed in the Findings of Fact section above, Bellamkonda discloses techniques for evaluating database queries, including hierarchical data cubes. (FF 6.) Bellamkonda discloses that a grouping distinguisher, or

grouping identifier, distinguishes groupings at each stage of computation and propagation. (FF 7.) In particular, Bellamkonda discloses hash partitioning and, further, partitioning rows according to grouping identifiers. (*Id.*)

We find that Bellamkonda's disclosure teaches hashing keys and assigning a group identifier at each stage of computation. In summary, we find that an ordinarily skilled artisan would have appreciated utilizing Cochrane's database service module to hash keys and subsequently assign a predefined group identifier to the respective keys during each stage of data processing. Thus, we find that the combined disclosures of Cochrane and Bellamkonda teach the disputed limitation.

Additionally, we note that the claim limitation in question is directed to a "a controller *adapted to* distribute rows in the first result set across the access modules based on a hash of columns of the second grouping set and at least another column that is assigned a predefined value." (App. Br. 10-11, Claims App'x.) (Emphasis added) Such language does not require that the controller actually distribute rows in the first result set across the access modules based on a hash of columns of the second grouping set and at least another column that is assigned a predefined value. Rather, it is a statement of intended use, which is fully met by a prior art structure that is capable of performing the intended use. That is, a statement of intended use in an apparatus claim cannot distinguish over a prior art apparatus that discloses all recited limitations and is capable of performing the recited function. *See In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997); *see Application of Dense*, 156 F.2d 76 (CCPA 1946). *See also Ex parte Satchell*, Appeal No. 2008-0071, 2008 WL 4828136 (BPAI 2008) (non-precedential). It follows

that Appellants have not shown that the Examiner erred in concluding that the combination of Cochrane and Bellamkonda renders dependent claim 7 unpatentable.

Appellants do not provide separate arguments for patentability with respect to dependent claims 8 and 9. Therefore, we select dependent claim 7 as representative of the cited claims. Consequently, Appellants have not shown error in the Examiner's rejection dependent claims 8 and 9 for the reasons set forth in our discussion of dependent claim 7. *See* 37 C.F.R. § 41.37(c)(1)(vii).

*Claims 19 through 21, 27, and 28*

Appellants offer the same argument set forth in response to the obviousness rejection of dependent claim 7 to rebut the obviousness rejection of dependent claims 19 through 21, 27, and 28. (App. Br. 12.) We have already addressed this argument in our discussion of dependent claim 7, and we found it unpersuasive. Consequently, Appellants have not shown that the Examiner erred in concluding that dependent claims 19 through 21, 27, and 28 are unpatentable over the combination of Cochrane and Bellamkonda.

## VI. CONCLUSIONS OF LAW

1. Appellants have not shown that the Examiner erred in rejecting claims 1 through 5, 13 through 16, and 22 through 24 as being anticipated under 35 U.S.C. § 102(a).
2. Appellants have not shown that the Examiner erred in rejecting claims 6 through 12, 17 through 21, and 25 through 28 as being unpatentable under 35 U.S.C. § 103(a).

## VII. DECISION

1. We affirm the Examiner's decision to reject claims 1 through 5, 13 through 16, and 22 through 24 as being anticipated under 35 U.S.C. § 102(a).

2. We affirm the Examiner's decision to reject claims 6 through 12, 17 through 21, and 25 through 28 as being unpatentable under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Vsh

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